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THE COLLECTION, EMERGENCE, AND RELEASE OF PARASITES
OF THE EUROPEAN CORN BORER, SEASON OF 1944 ^{1/}

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Collections of overwintering European corn borer larvae were made during November and December 1943 to furnish parasites for release in the summer of 1944. Three collecting centers were established: (1) Southeastern Massachusetts as a source of Macrocentrus gifuensis (Ashm.) with some other species to be obtained incidentally, (2) central Connecticut as a source of Inareolata punctoria Roman, and (3) Burlington County, N. J., as a source of Lydella grisescens R. D. The number of borers collected was as follows: Southeastern Massachusetts, 110,000; central Connecticut, 168,000; and Burlington, N. J., 170,000, or a total of 448,000 from all sources. Approximately 60 people, many of them working only part time, were employed on a piecework basis in the collecting operation. Corn borer larvae were cut from stalks in the fields as well as from infested stalks hauled in to a central point. Overwintering borers obtained were put into packets made up of corrugated cardboard strips or, in the case of borers later to be isolated, into folded newspaper. All larvae collected were shipped in screen-sided cans to the Moorestown, N. J., corn borer laboratory for storage and rearing.

The field-collected material was held in cold storage at 36° F. and a relative humidity not lower than 70 percent, with contact water added when needed. During the storage period the 110,000 borers collected in Massachusetts were isolated in individual glass vials. Isolation gives needed room for the formation of cocoon clusters and emergence of adults of Macrocentrus gifuensis. Borers collected in Connecticut and New Jersey were handled in corrugated packets of 300 larvae each.

Incubation of the material was at 80° F. and a relative humidity not lower than 70 percent. Each lot or group of borers was placed under incubation at the proper time to insure adult parasites for liberation at a time when the host in the field could be expected to be in the preferred stage of development for parasitization. Releases were scheduled for localities from North Carolina north and west to Wisconsin and Iowa.

^{1/} State agencies in Iowa, Illinois, Maryland, Delaware, and Virginia materially supported this work through the provision of funds or personnel or both.

Emergence was taken in seven emergence rooms, collection of parasite adults being made directly into shipping containers by means of air suction furnished by electrically operated hand collectors. Emergence of the exotic species of adult parasites from the larvae collected in the various localities is shown in table 1.

Table 1.--Parasite emergence and parasitization of borers from various collecting localities, based on mass emergence records, 1944

Local- ity	Borers col- lected	Macrocentrus gifuensis cocoon clusters		Inareolata punctoria adults		Lydella grisea adults		Chelonus annulipes adults		Total borers parasitized	
		No.	%	No.	%	No.	%	No.	%	No.	%
Mass.	110,000	29,709 ^{1/2}	27.0	935	0.8	6,130	5.6	2,826	2.6	39,600	36.0
Conn.	168,000	400 ^{2/}	0.2	12,062	7.2	1,441	0.9	5 T		13,908	8.3
N. J.	170,000	0	0	5	T	22,162	13.0	0	0	22,167	13.0
Total	448,000	30,109 ^{3/}		13,002		29,733		2,831		75,675	

1/ Adults produced, 445,197.

2/ Adults produced, 5,937.

3/ Adults produced, 451,134.

The only native parasite obtained in numbers incidental to the rearing of the exotic species was Bassus agilis Cresson. A total of 74 adults of this species was reared of which 69 were from larvae collected in southeastern Massachusetts, 4 from central Connecticut, and 1 from New Jersey. One specimen of Meteorus sp. was reared from Connecticut material.

Most of the shipments of adult parasites were made in screen-sided metal cans wrapped in moist cloth and packed in insulated wooden boxes with a pail of cracked ice. A newer shipping container modified from a pint size ice cream carton was given a wide test and found satisfactory and in some ways better as well as much cheaper than the metal cans. Railway express was utilized for all distant shipments but automobile transportation was used to all release localities within a practical distance of Moorestown laboratory.

A total of 502,805 adult parasites were shipped during the season with a mortality of 5.1 percent on an average. The highest mortality rate took place in the long-distance shipments such as those from New Jersey to Indiana, Illinois, Iowa, Florida, and Kansas. In these shipments mortalities usually ranged from 7 to 10 percent of the adults shipped. For shipments sent shorter

distances such as those from New Jersey to New York, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, Kentucky, and Ohio, the parasite mortality en route was usually less than 3 percent. Mortality in all shipments averaged 5.1 percent. Time en route for most shipments was less than 2 days, but in a few instances missed connections, due to late trains and other circumstances, caused minor delays up to 24 hours.

During the season of 1944 a total of 318 colonies of parasites were released in 15 States including Delaware, Illinois, Indiana, Iowa, Kentucky, Maryland, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Virginia, Wisconsin, Florida, and Kansas. Liberations in the last two States listed were test releases against the sugarcane borer (Diatraea saccharalis (F.)) and the southwestern corn borer (Diatraea grandiosella Dyar). Of the parasites released 219 colonies totaling 435,096 adults were the braconid Macrocentrus gifuensis. Sixty-two colonies totaling 28,360 adults of the tachinid Lydella grisescens, 28 colonies totaling 11,125 adults of the ichneumonid Inareolata punctoria, and 9 colonies totaling 2,659 adults of the braconid Chelonus annulipes Wesn., were released in 1944. The total number of adults released includes a relatively small number of parasites obtained from summer material collected in July 1944. Table 2 is a summary showing releases made in 1944 of the various parasites by States.

Table 2.--Summary of releases of parasites of the European-corn-borer in 1944

State	Macrocentrus gifuensis		Lydella griseus		Inareolata punctoria		Chelonus annulipes		Total colonies		Total adults	
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Delaware	20	40,721	4	1,989	3	1,482	1	495	28	44,687		
Illinois	21	40,492	12	5,890	2	836	1	597	36	47,815		
Indiana	18	33,860	2	995	1	402	0	0	21	35,257		
Iowa	63	122,115	17	8,090	8	3,133	2	490	90	133,828		
Kentucky	5	10,230	1	500	1	488	0	0	7	11,218		
Maryland	25	49,530	10	4,977	5	2,467	0	0	40	56,974		
New Jersey	14	29,862	5	483	3	190	3	376	25	30,911		
New York	6	12,340	1	500	0	0	0	0	7	12,840		
North Carolina	1	1,981	1	495	0	0	0	0	2	2,476		
Ohio	2	4,120	1	493	1	486	0	0	4	5,099		
Pennsylvania	27	55,303	2	998	1	494	0	0	30	56,795		
Virginia	8	15,581	2	995	2	887	0	0	12	17,463		
Wisconsin	6	11,971	4	1,955	1	260	2	701	13	14,887		
Florida	2	5,100	0	0	0	0	0	0	2	5,100		
Kansas	1	1,890	0	0	0	0	0	0	1	1,890		
Total	219	435,096	62	28,360	28	11,125	9	2,659	318	477,240		